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## In-Class Exercise: Introduction to JMP®

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**IN-CLASS EXERCISE:  
INTRODUCTION TO JMP®**

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**Survey Research Methods Short Course**  
Marine Corps Operational Test and Evaluation Activity  
Quantico, Virginia

May 8-14, 2008

## In-class Exercise: Introduction to JMP

**Goal:** To introduce students to JMP® software.

**Lab type:** Instructor demonstrates software followed by hands-on exercises for students.

**Time allotted:** 90 minutes.

**Data:** SurveyData.jmp (see appendix for survey instrument)

### DEMONSTRATION

#### 1. Overview of the software

##### (a) Opening screen and layout

##### i) Pull-down menus, particularly:

- (1) File
- (2) Edit
- (3) Tables
- (4) Analyze
- (5) Help

##### ii) Tools, particularly:

- (1) Arrow
- (2) Selection
- (3) Grabber

##### iii) Documentation and tutorials (Help > Books)

##### (b) Opening data tables / importing data (File > Open)

##### i) JMP files

##### ii) Excel tables

##### iii) Creating a table in JMP

##### (c) Layout of JMP data files/tables

##### i) List / number of variables (“Columns” box)

##### ii) List / number / status of observations (“Rows” box)

##### iii) Changing variable type

##### iv) Records in rows, variables in columns

- (1) Viewing / changing column properties
  - (2) Creating a new column or row
  - (3) Deleting a column or row
  - v) Missing data (dots vs. blanks)
- 2. Calculating basic statistics (Analyze > Distribution)
  - (a) Output depends on type of variable
    - i) Discrete: bar chart and frequency table
    - ii) Continuous; Histogram, boxplot, quantiles, and moments
  - (b) Calculating for multiple variables simultaneously
  - (c) Options (look under red triangle), particularly:
    - i) Discrete
      - (1) Horizontal layout for bar chart (triangle > Display Options > Horizontal Layout)
      - (2) Axis scales for bar chart (triangle > Histogram Options)
    - ii) Continuous
      - (1) Horizontal layout for histogram (triangle > Display Options > Horizontal Layout)
      - (2) Axis scales for histogram (triangle > Histogram Options)
      - (3) Turn boxplot on / off
      - (4) t-test (or z-test) for the mean
      - (5) Fit distribution
    - iii) Use of grabber to change / adjust plots
    - iv) Interactive plot features: click on a bar, data is highlighted in table
      - (1) Excluding data from analysis (right click on a highlighted row and choose Exclude/Unexclude)
        - (a) Unexclude all excluded rows: Rows > Exclude/Unexclude
- 3. Formulas
  - (a) Creating a new column (variable)
    - i) Cols > New Column...
    - ii) Double click to the right of the last column
  - (b) Creating a formula: right click column name > Formula
  - (c) Formula dialog box

**EXERCISES**

## 1. Exploring the data

- (a) How many records (observations) are in the data set? \_\_\_\_\_
- (b) How many variables are in the data set? \_\_\_\_\_
- (c) What is the symbol for a:
  - i) continuous variable? \_\_\_\_\_
  - ii) ordinal variable? \_\_\_\_\_
  - iii) nominal variable? \_\_\_\_\_
- (d) How is a missing observation indicated for a:
  - i) numeric variable? \_\_\_\_\_
  - ii) character variable? \_\_\_\_\_

## 2. Calculating basic statistics and creating plots

- (a) How many respondents are male (i.e., *Sex=M*)? \_\_\_\_\_
- (b) Create a bar chart of the respondents' schools (i.e., *CurricNumber*)
  - i) Which school has the largest number of respondents? \_\_\_\_\_
    - (1) How many? \_\_\_\_\_
  - ii) Add a count axis to the bar chart.
  - iii) Next to each bar, show the percent of respondents in each school.
- (c) Use the bar chart to exclude respondents from GSIOS.
  - i) Now how many of the non-GSOIS respondents are male? \_\_\_\_\_
- (d) Create a histogram of the respondents' answers to question 1 (i.e., variable *I*)
  - i) Plot this histogram horizontally and add a count axis to the bar chart.
  - ii) Next to each bar, show the percent of respondents in each school.
  - iii) For question *I*:
    - (1) What is the mean? \_\_\_\_\_

- (2) What is the standard deviation? \_\_\_\_\_
- (3) How many respondents did not answer this question? \_\_\_\_\_
- (4) Test whether the mean is equal to 3 (neutral). Do you accept or reject the null hypothesis that the mean is equal to 3? \_\_\_\_\_
- (5) Why does the boxplot look so strange?

### 3. Formulas

- (a) Create a new variable called *Sum17* which is the sum of the responses to questions 17a – 17e
  - i) What is the mean of *Sum17*? \_\_\_\_\_
  - ii) What is its standard deviation? \_\_\_\_\_
  - iii) Test whether the mean is equal to 19. Do you accept or reject the null hypothesis that the mean is equal to 19? \_\_\_\_\_
  - iv) Does the boxplot look better? Why or why not?
  - v) Use the grabber tool to:
    - (1) change the width of the histogram bars, and
    - (2) adjust the *x*-axis.

### 4. Fitting distributions

- (a) Fit a normal distribution to *Sum17*: triangle > Fit Distribution > Normal.
- (b) Does the fit look good visually? Why or why not?
- (c) Test the fit: triangle (next to Fitted Normal) > Goodness of Fit. Does the Shapiro-Wilk W Test confirm or refute your answer to part (b)?

## APPENDIX: SURVEY INSTRUMENT

### NPS Student Survey

#### Introduction

You have been selected to participate in a survey of new Naval Postgraduate School (NPS) students. The purpose of this survey is to assess various aspects of academic life at NPS, including your quality of life, the physical environment and support services, and policies and requirements set forth by NPS. The results of the survey will be used by the NPS Dean of Students, the Director of Institutional Research, and other members of the NPS administration to improve NPS. This is your opportunity to provide NPS with frank feedback on what works well and what does not.

No tangible compensation will be given for participation in the survey. If you agree to participate, you are free to withdraw at any time without prejudice. Upon completion of the research, a copy of the final report will be available from Dr. Fran Horvath, Director of Institutional Research. Your participation in this survey is voluntary, although your input is extremely valuable for the improvement of NPS.

Please note that all survey records and data will be kept strictly confidential. Your participation in the survey and your responses to the survey will not be disclosed outside of the research team. Survey results will only be reported in the aggregate so that individual responses cannot be determined. Upon completion of the survey, all records identifying your participation in the survey will be destroyed.

If you have any questions or comments regarding this survey, please contact Professor Ron Fricker, 831-656-3048 (rdfricker@nps.edu) or LT Brent Olde (NPS IRB chair), 831-656-3807 (baolde@nps.edu).

#### Quality of Life

We begin with some questions about your experience in-processing (i.e., enrolling) at NPS. Please consider how these services provided by NPS contribute to both your learning experience and your activities outside of academics.

**1. In general, how do you rate your satisfaction or dissatisfaction with the IN-PROCESSING procedures at NPS?**

- ☐ Very Satisfied  
☐ Satisfied  
☐ Neutral  
☐ Dissatisfied  
☐ Very Dissatisfied

## NPS Student Survey

### 2. How do you rate the IN-PROCESSING provided by each of the following support services (briefings, orientation, materials, service, etc.):

	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	N/A*
Registrar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Program Office	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student Services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sponsor Program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information Technology (ITACS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chaplain Services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Medical Services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Morale, Welfare and Recreation (MWR)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Military Housing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

OPTIONAL: We appreciate any specific feedback on the above items.

\*Please respond \*N/A\* for any items which are not applicable or you do not know.

## Quality of Life

In the previous question we asked you about the in-processing support you received. Now we would like to know about the service you have received AFTER in-processing.

### 3. Following in-processing, how do you rate the SERVICE provided by the following organizations at NPS:

	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	N/A*
Registrar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Program Office	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student Services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sponsor Program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information Technology (ITACS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chaplain Services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Medical Services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Morale, Welfare and Recreation (MWR)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Military Housing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

OPTIONAL: We appreciate any specific feedback on the above items.

\*Please respond \*N/A\* for any items which are not applicable or you do not know.



## NPS Student Survey

### Quality of Life - Work Load

#### 4. To what level do you agree or disagree with the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	N/A*
I am able to pursue interests outside of my studies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have sufficient time to spend with my family and/or friends.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My academic workload is high.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

OPTIONAL: We appreciate any specific feedback on the above items.

\*Please respond \*N/A\* for any items which are not applicable or you do not know.

### Physical Resources

In this section we would like your opinions on physical resources that support your academic studies. We will ask you about the NPS library, laboratories, classrooms, and other facilities.

#### 5. Please rate your satisfaction or dissatisfaction with the campus workspace(s) available to you (e.g., cubicle, office, library study room, etc.)

- ☐ Very Satisfied  
☐ Satisfied  
☐ Neutral  
☐ Dissatisfied  
☐ Very Dissatisfied  
☐ N/A\*

OPTIONAL: We appreciate any specific feedback on the above items.

\*Please respond \*N/A\* if this item is not applicable or you do not know.

### Physical Resources - Library

## NPS Student Survey

**6. Please rate your level of satisfaction or dissatisfaction with the following LIBRARY resources:**

	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	N/A*
Books	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Databases/Searches engines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Journals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilities (computers, study rooms, carrels)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reference assistance and instruction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Restricted resources and services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Services (circulation, interlibrary loan, course reserve, printing, etc)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

OPTIONAL: We appreciate any specific feedback on the above items.

\*Please respond "N/A" for any items which are not applicable or you do not know.

## Support Services - Laboratory

**7. Do you personally use a laboratory for any reason in your curriculum (e.g., computer laboratory, research laboratory, etc.)?**

- ☐ Yes  
☐ No

## Physical Resources - Laboratory Facilities

## NPS Student Survey

### 8. The LABORATORY facilities for my program are...

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	N/A*
... conveniently located.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... in good working condition.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... equipped with current technologies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... appropriate for military research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... well maintained.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... equipped with sufficient resources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... responsive to course and research needs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

OPTIONAL: We appreciate any specific feedback on the above items.

\*Please respond \*N/A\* for any Items which are not applicable or you do not know.

## Physical Resources - Classrooms

### 9. The CLASSROOMS for my program are...

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	N/A*
... conveniently located.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... in good working condition.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... equipped with current technologies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... clean.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... comfortable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... large enough.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

OPTIONAL: We appreciate any specific feedback on the above items.

\*Please respond \*N/A\* for any Items which are not applicable or you do not know.

## Support Services - Wireless Usage

### 10. While on the NPS campus, do you use wireless access?

- ☐ Yes  
☐ No

## Support Services - Wireless Access

## NPS Student Survey

**11. While on the NPS campus, is the wireless access sufficient everywhere you need it?**

- ☐ Yes  
☐ No

### Support Services - Wireless Locations Needed

**12. If you could add or improve wireless capability to one location on campus where it is currently insufficient, where would it be?**

Building

Please Select:

Other (please specify)

### Support Services - Warfighting Community

During the course of their time here at NPS, many students feel it is important to maintain links to their warfighting or professional community either through E-mail connectivity or research. These communities are typically your sponsoring agency, research organizations you are collaborating with, end-users of your NPS research/coursework, etc.

**13. How important do you feel it is to maintain contact with your warfighting or professional community while here at NPS?**

- ☐ Very Important  
☐ Important  
☐ Neutral  
☐ Unimportant  
☐ Very Unimportant  
☐ N/A\*

**14. Please rate your satisfaction or dissatisfaction with NPS' resources for maintaining contact with your warfighting or professional community?**

- ☐ Very Satisfied  
☐ Satisfied  
☐ Neutral  
☐ Dissatisfied  
☐ Very Dissatisfied  
☐ N/A\*

OPTIONAL: We appreciate any specific feedback you have on the above items.

\*Please respond "N/A" for any items which are not applicable or you do not know.

### Teaching and Learning

You are almost finished. Just a few questions below about academics at NPS.

## NPS Student Survey

**15. As you think about the INSTRUCTORS you have had thus far at NPS, please indicate your level of agreement or disagreement with the following statements:**

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	N/A*
My instructors expectations are consistent with what a graduate education should entail.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My instructors actively engage me in the learning process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My instructors provide useful feedback about my performance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My instructors provide real world examples during class.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

OPTIONAL: We appreciate any specific feedback on the above items.

\*Please respond "N/A" for any items which are not applicable or you do not know.

## Teaching and Learning - Academic Program

**16. Now, thinking about your academic program in general, please indicate your level of agreement or disagreement with the following statements:**

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	N/A*
My academic program is challenging.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My academic program actively engages me in the learning process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The NPS faculty in my academic program encourage me to participate in defense-related research.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My academic program challenges me to meet high expectations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The expectations of the faculty in my academic program are consistent with the program's graduation requirements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

OPTIONAL: We appreciate any specific feedback on the above items.

NPS Student Survey						
*Please respond *N/A* for any items which are not applicable or you do not know.						
Policies and Requirements						
<b>17. Please indicate the degree to which you agree or disagree with the following statements below about NPS POLICIES and academic REQUIREMENTS.</b>						
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	N/A*
I was made aware of NPS' policy on student conduct and behavior (Student Information Handbook).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was made aware of NPS' grievance procedures for students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The academic advising I receive at NPS provides useful information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My academic advisor provides relevant information about academic requirements.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am clear about the graduation requirements for my program.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OPTIONAL: We appreciate any specific feedback on the above items.						
<div style="border: 1px solid #ccc; height: 40px; width: 100%;"></div>						
*Please respond *N/A* for any items which are not applicable or you do not know.						
End of Survey						
<b>18. Is there anything else you would like to tell us about your experiences at NPS?</b>						
<div style="border: 1px solid #ccc; height: 100px; width: 100%;"></div>						
Thank you						
<p>Thank you for taking the time to complete this survey. Your input will help NPS continue to improve the academic environment and student support services for both current and future students.</p> <p>If you have any questions or comments regarding this survey, please contact Professor Ron Fricker, 831-656-3048 (rdfricker@nps.edu).</p>						